

MAP SYMBOLS

CONTACT--Dashed where approximately located.

FAU ----- line

FAULT--Dashed where approximate or based on lineaments on aerial photos, dotted where covered. Bar and ball on downthrown side Arrows show direction of movement. No symbol where offset unknown.

BEDDING--Strike and dip of bedding in sedimentary rocks and layering in ash-flow tuffs.

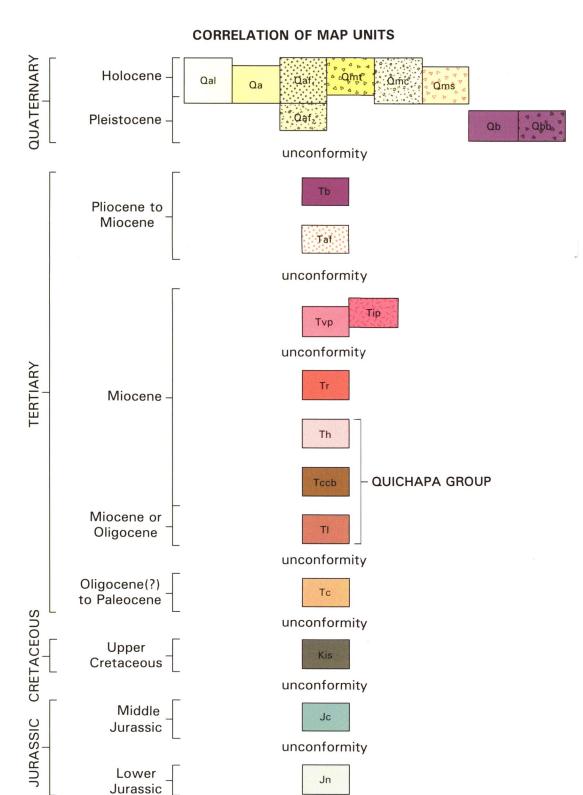
LAYERING--Strike and dip of layering in lava flows and flow domes.

Inclined.

Vertical.

 SYNCLINE AXIAL TRACE--Dashed where approximately located. Dotted where covered.

PROSPECT



SYSTEM AND SERIES		UNIT		SYMBOL	THICKNESS feet, (meters)	LITHOLOGY
QUATERNARY	Holocene	Sur	ficial deposits		0-200 (60)	
	Pleistocene	Younger basalt flows		Qb	300 + (90)	
		Basaltic breccia		Qbb	300 + (90)	DADA DADA
		Old	er basalt flows	Tb	200 (60)	
TERTIARY	Pliocene to Miocene(?)	Olde	Oldest alluvial-fan deposits		af 400 + (120)	00000
	Miocene Miocene or	Monzonite of the Pine Valley Mountains		Tip	1000 (300)	+ + + + + + + + + + + + + + + + + + + +
		Pine Valley Latite		Tvp	1700 (520)	
		Ren	cher Formation	Tr	500 + (150)	× × ×
		Quichapa Group	Harmony Hills Tuff	Th	240 (70)	×××××× ××××××
			Bauers Tuff Mbr. of Condor Cyn. Fm.	Tccb	200 (60)	XXXXXXXX A X A X A
	Oligocene	ā	Leach Canyon Formation	TI	250 (75)	× × × ×
	Oligocene(?) to Paleocene	Cla	on Formation	Тс	400-500 (120-150)	
CRETACEOUS	Upper	Iron	Springs Formation	Kis	3800 (1160)	
JURASSIC	Middle	Aiddle Carmel Formation		Jc	800 (240)	
	Lower	Nav	ajo Sandstone	Jn	500 + (150)	

DESCRIPTION OF MAP UNITS

Talus -- Accumulated rockfall deposits of angular blocks found downslope from bedrock. Maximum thickness about 10 feet (3 m).

Modern alluvium -- Unconsolidated, poorly sorted sand, silt, and gravel. Mostly floodplain and channel deposits.

Maximum thickness about 30 feet (10 m).

Modern alluvial-fan deposits -- Unconsolidated, poorly sorted silt and sand, with minor clay and gravel. Deposited in active, or recently abandoned, coalescing alluvial fans. Thickness may exceed 100 feet (30 m).

Alluvium -- Unconsolidated sand and silt. Found typically in small basins with narrow outlets. Partially dissected.

Maximum thickness about 30 feet (10 m).

Colluvium -- Unconsolidated, poorly sorted silt, sand, and gravel deposited by sheetwash and gravity movement on steep slopes. Occurs as dissected patches. Maximum thickness about 20 feet (6 m).

Landslide deposits -- Poorly sorted, angular debris derived from nearby bedrock, deposited by mass-movement processes. Contains blocks of Pine Valley Latite (Tvp) as large as 30 feet (10 m) in diameter. Partially dissected. At least 200 feet (60 m) thick.

Older alluvial-fan deposits -- Unconsolidated, poorly sorted gravel, silt, and sand deposited in abandoned alluvial fans. Dissected and partially covered by younger alluvial fans (Qaf₁). Clasts include Claron Formation upper white limestone (Tc), Leach Canyon Formation (Tl), Bauers Tuff (Tccb), Harmony Hills Tuff (Th), older basalt (Tb), and the Stoddard Mountain monzonite porphyry pluton. At least

100 feet (30 m) thick.
Younger basalt flows -- Dark gray to black alkali olivine basalt. May exhibit columnar jointing. Age estimated to be 1 to 1.5 million years. At least 300 feet (90 m) thick.

Basaltic breccia -- Reddish-brown blocks of scoriaceous basalt, poorly consolidated, in partially buried cinder cones. Possible source for nearby younger basalt flows (Qb). Cones at least 300 feet (90 m) high.

Older basalt flows -- Olivine-bearing basalt flows. Dark gray, with lighter weathering rinds 0.8 inches (2 cm) thick. Remaining thickness 200 feet (60 m).

Oldest alluvial-fan deposits -- Poorly to moderately consolidated sandstone and conglomerate, with minor claystone. Prominent clasts include lower Claron Formation pisolitic limestone and quartzite (Tc), Pine Valley Latite (Tvp), Iron Springs Formation (Kis), and the Stoddard Mountain monzonite porphyry pluton. At least 400 feet (120 m) thick.

Monzonite of the Pine Valley Mountains -- Intrusive monzonite porphyry forming sill or laccolith. Ranges in color from dark brown at the base to almost white at the top. Contains 30-35 percent phenocrysts of plagioclase, clinopyroxene, and biotite, with lesser sanidine and orthopyroxene. Groundmass is holocrystalline to hypocrystalline. Intrudes between Claron Formation (Tc) and Pine Valley Latite (Tvp). About 1,000 feet (300 m) thick. Age estimated at about 21 million years.

Pine Valley Latite -- Extrusive latite porphyry forming flows or flow domes. Gray to purple, with the same phenocrysts as associated monzonite (Tip), and traces of hornblende. Glassy groundmass. Flow layering and normal jointing perpendicular to layering. Three stratigraphic zones are present above a basal flow breccia. The lower zone has steep alternating layers, the middle zone has massive steep to gentle layering, and the upper zone has gentle layers. As much as 1,700 feet (520 m) thick. Age estimated at about 21 million years.

Rencher Formation -- Poorly resistant, light gray to tan, slightly welded, ash-flow tuff and other volcanic and volcaniclastic rocks. Contains 25-35 percent phenocrysts of plagioclase, hornblende, and lesser biotite and clinopyroxene. Lithic fragments of quartzite and volcanic rocks constitute 15 percent of the tuff. Age is 21.5 to 21.8 million years. At least 500 feet (150 m) thick.

Harmony Hills Tuff (Quichapa Group) -- Moderately resistant, tan, moderately welded ash-flow tuff. Contains 40-45 percent phenocrysts of plagioclase, biotite, and lesser quartz, hornblende, and clinopyroxene. Thickness is 240 feet (70 m). Age is about 22 million years.

Bauers Tuff Member of Condor Canyon Formation (Quichapa Group) -- Resistant, pale red to pale lavender, densely welded ash-flow tuff. Contains 10-15 percent phenocrysts of sanidine and plagioclase, with lesser biotite and a little hornblende and clinopyroxene. Unit has a thin basal vitrophyre and a massive top. Thickness is 200 feet (60 m). Age is about 23 million years.

Leach Canyon Formation (Quichapa Group) -- Resistant, purplish gray, densely welded ash-flow tuff. Contains 15-25 percent phenocrysts of quartz, sanidine, and plagioclase, with lesser biotite and minor hornblende, clinopyroxene, allanite, and sphene. Red lithic fragments with white halos constitute 5 percent of the rock. About 250 feet (75 m) thick. Age is about 24.6 million years.

Claron Formation -- Fluvial and lacustrine sandstone,

limestone, shale, and conglomerate. Mostly red and white. Prominent white limestone at top. Conglomerate at the base and in upper part. Pisolitic algal limestone in lower part. Thickness is 400 to 500 feet (120-150 m).

Iron Springs Formation -- Sequence of alternating thin sandstone and silty shale deposited in fluvial, alluvial-plain, and paludal environments. Sandstones are buff to white. Shales are purple and gray or red, yellow, and light gray. Sandstone ledges interspersed at about 50-foot (15 m) intervals. Thickness as much as 3,800 feet (1,100 m).

Carmel Formation -- Lower thin, red siltstone overlain by thick, platy argillaceous limestone which is overlain by an upper red siltstone and sandstone unit. Total thickness about 800 feet (240 m).

Navajo Sandstone -- Red, massive sandstone with largescale eolian cross-bed sets as much as 50 feet (15 m) thick. Incomplete thickness of about 500 feet (150 m).

